IN THE SPECIFICATION:

Please make the following amendments to the specification in the indicated paragraphs.

**[0006]** According to the invention there is provided a handling system for incorporation in a trailer for use with palletized freight. The handling system incorporates a segmented, translatable platform. Among the segments is a principal or main segment which supports the palletized freight during shipping. The main upper surface of each of the segments is a conveyor. The conveyors are aligned from segment to segment to allow cooperative movement, respacing and off loading of the palletized freight on and between the segments and off ~~of~~ an end segment. The platform translation system allows the platform to be extended from an open end or side of the trailer The segmentation of the platform allows use of the end and a mid segment to lower a piece of palletized freight to a surface below the level of the main segment of the platform.

**[0021]** Referring now to the figures and in particular to **Figs. 1** and **2**, a trailer **10** incorporating a translatable, segmented platform **11** for palletized freight modules **19** is shown. Translatable platform **11** is, in its retracted position within trailer **10**, ~~and~~ fully supported on the bed **47** of the trailer (see **Figs. 8**, **9**) and may be repositioned as a unit off the bed through an opening in the trailer, such as end opening **17**. As shown in **Fig. 1**, the portion of translatable, segmented platform **11** moved out of the trailer **10** may come to rest on the upper or target surface **13** of a raised loading dock **15**. Translatable, segmented platform **11** provides a support floor for a plurality of palletized freight modules **19**. The preferred embodiment of the invention works best with freight that is bundled into standard sizes with a standard orientation, here termed palletized freight modules **19** ~~units~~, although it is not intended that the invention as claimed be limited to freight of such character.

**[0022]** Translatable, segmented platform **11** comprises three segments in the preferred embodiment, including an end segment **21**, a mid segment **23** and a main segment **25**. Each segment **21, 23, 25** has a distinct function and each segment has its own, independently actuable conveyor. These include an end segment conveyor **27** and a mid segment conveyor **31**. End segment **21** is articulated with mid segment **23** along adjacent edges and mid segment **23** is articulated with main segment **25** along common edges. The axes of articulation are parallel and horizontally disposed allowing mid segment **23** to be rotated downwardly from one end of main segment ~~27~~ **25** and end segment **21** to be rotated upwardly from one edge of mid segment **23**. Hydraulic ~~pistons~~ actuators, including hydraulic ~~piston~~ actuator **35**, connected between mid segment **23** and end segment **21**, are used to rotate the segments **23, 21**. This allows end segment **21** to be lowered to and placed parallel on a supporting surface **33** while remaining flat. End conveyor **27**, mid segment conveyor **31** and the conveyor **41** for main segment **25** are aligned for cooperation and may be operated in a fashion to separate the end or "current last in" palletized freight module ~~unit~~ **19** from the remaining modules ~~units~~. This separation allows the current last in palletized freight module **19** ~~unit~~ to lowered to the target surface **33** on segment **21** and moved off of end segment **21** at end **29**.

**[0023]** Referring now to **Figs. 3** and **4** translation and positioning of the segments of platform **11** is illustrated. Translation of the segments **21, 23, 25** occurs as a unit, that is platform **11** may be moved horizontally in and out trailer **10** from a fully retracted position "A" on bed ~~13~~ **47**, to an intermediate position "B" and finally to a position of maximum extension "C" where only a small portion of the platform **11** remains in trailer **10** and supported on the bed **47**. Translation occurs through an opening **17** in the trailer **10**, typically at one end of the trailer, although it is conceivable that it could be done toward a side of the trailer. Platform **11** is illustrated in a reconfigured shape "D" where mid segment **23** has been rotated in a clockwise direction A as viewed in **Fig. 5** and end segment **21** has been simultaneously and synchronously rotated in a counterclockwise direction B to drop the level of end segment **21** below the

level of main segment **25**. Hydraulic ~~pistons~~ actuators **35** and **37** are pivotally coupled between end segment **21** and mid segment **23** (for ~~piston~~ actuator **35**) and mid segment **23** and main segment **25** (for ~~piston~~ actuator **37**). Contraction of the ~~pistons~~ actuators operates to introduce a fold in the platform **11** as illustrated in **Fig. 5**, while extension of the ~~pistons~~ actuators straightens the platform **11**. Strain on ~~midsegment~~ mid segment **23** is minimized by providing that the points of attachment of hydraulic ~~pistons~~ actuators **35** and **37** on midsegment **23** are collocated.

**[0024]** As illustrated in **Fig. 6**, translatable, segmented platform **11** is installed on the bed **47** of trailer **10**, and is preferably made as compact as possible in the vertical dimension to minimize the amount of space occupied. ~~Freight is~~ The palletized freight modules 19 are preferably kept on main segment **25** during shipping, but the trailer **10** may be filled, with modules ~~cargo~~ carried on all of the segments **21, 23, 25** if the destination has a raised dock. Otherwise, enough of platform **11** must be kept clear of palletized freight modules **19** ~~cargo~~ to allow mid segment **23** to be cleared of modules ~~pallets~~ for rotation out of the horizontal when it is necessary to lower end segment **21**. It is conceivable that platform **11** could be adapted to fold end segment **21** and mid segment **23** upwardly within trailer **10** to conserve space, or that the two segments could be detached from the main segment **25** and carried beneath the bed **47**. Either adaptation can be expected to add considerable mechanical complexity to the system.

**[0025]** Conveyors **27, 31, 41** can operate simultaneously with translation of the translatable, segmented platform **11**. As illustrated in **Fig. 7**, platform **11** is being withdrawn into trailer **10** in the direction indicated by the letter ~~B~~ N while end conveyor **27** moves a palletized freight module ~~pallet~~ **19** off the end **29** of the platform **11** (direction M). Preferably the velocity of platform **11** cancels the velocity of the upper surface of conveyor **27** relative to the ground so that the velocity of the current last in palletized object **19** is also zero relative to the surface (**13** or **33**) on to which it is transferred. Simultaneously, the remaining palletized freight modules ~~objects~~ **19** are moved toward the opposite end (direction O) of platform **11** at the same time the platform **11** is withdrawn into the trailer **10**. Motion may be ramped up and down to

avoid tumbling palletized freight modules **19** ~~the cargo~~ on account of their ~~its~~ inertia.

**[0026]** Translation of platform **11** is preferably confined to a straight line. Referring to Fig. **8**, it may be seen that platform **11**, within trailer **10**, rolls along parallel tracks **45** running lengthwise along the bed ~~13~~ **47** of trailer **10**. Translatable, segmented platform **11** may be moved by any number of devices. Here a translation mechanism **43** is provided by an elongated worm gear coupled into the main segment **25**. Conveyors **27**, **31** and **41** are located to provide the upper surfaces of end segment **21**, mid segment **23** and main segment **25**, respectively. The worm gear translation mechanism **43** is coupled to main segment **25** below the level of conveyor **41**. The conveyors **27, 31, 41** are aligned on one another and travel on parallel axles allowing packages to be freely moved from one conveyor to an adjacent conveyor.

**[0027]** Each segment **21, 23, 25** of translatable, segmented platform **11** comes with a plurality of wheel assemblies **51** such as illustrated in **Fig. 9** which extend from the sides (or from the bottoms of the segments **21, 23, 25** along the sides thereof) of the segments **21, 23, 25** aligned with the direction of travel of the platform. Wheel assemblies **51** are set in the tracks **45** allowing to and fro movement of platform **11** in the direction of elongation of the tracks **45**.

**[0028]** Referring to **Fig. 10** a hinge or joint **53** providing articulation between main segment **25** and mid segment **23** is illustrated. Joint **53** is located along the lower surfaces of the segments **25, 23** and toward the outside edge of the segments **25, 23** allowing mid segment **23** to articulate downwardly from main segment **25**. A similar joint (not shown) is provided between mid segment **23** and end segment **21**, except that it is located along the top surfaces, outside of the conveyors **27, 31**, allowing the end segment **21** to rotate upwardly from the mid segment **23**.

**[0029]** Operation of the translatable, segmented platform **11** is illustrated in **Fig. 11**. Operation is typically done by the truck operator using a control interface positioned to allow the process to be directly watched. At step ~~A~~ Q an array of palletized freight modules ~~units~~ **19** designated ~~A-D~~ W, X, Y and Z are situated on main segment **25** of translatable, segmented platform **11**. This is a preferred position for the palletized units

**19** during shipping. Where the destination is a facility that requires use of platform **11** to lower palletized freight modules ~~units~~ **19** enough space must be left on platform **11** to allow the palletized freight modules **19** ~~units~~ to be positioned so that mid segment **23** is clear of any modules ~~units~~. One palletized freight module ~~unit~~ **19** is positioned on end segment **21** during lowering operation.

**[0030]** Moving to step ~~B~~ R the process of repositioning palletized freight modules ~~units~~ **19** is illustrated. Conveyors **41, 31, 27** installed on main segment **25**, mid segment **23** and end segment **21** operate to move all four palletized freight modules **19** ~~units~~ toward the end segment as indicated by arrow E. Once the current ~~last-in~~ last-in palletized freight module ~~unit~~ **19**, designated ~~A~~ W, is fully off ~~of~~ main segment **25**, the conveyor **41** for main segment **25** stops while the conveyors **31, 27** for mid segment **23** and end segment **21** continue to run to move the "W" designated palletized freight module **19** in the direction F until the ~~current last-in~~ palletized freight module ~~unit~~ **19** is fully off of the mid segment and preferably positioned centered on end segment **21** as illustrated in step ~~C~~ S.

**[0031]** The palletized freight module ~~unit~~ **19** disposed on end segment **21** may or may not need to be lowered to ground level. The process is illustrated as including a lowering step ~~D~~ T. Mid segment **23** is pulled by ~~pneumatic~~ hydraulic actuators **37** contracting to rotate the segment counter-clockwise as indicated at H. Simultaneously, end segment **21** is kept level by retraction of ~~pneumatic~~ hydraulic actuators **35**, the segment rotating clockwise synchronously with mid segment **23** as indicated by the letter I. Sensors may be disposed on the bottom of end segment **21** to determine when the segment is fully supported from underneath. Next, at step ~~E~~ U, translatable, segmented platform **11** is withdrawn in the direction indicated by the letter K while the conveyor **27** for end segment **21** operates to move the "W" palletized freight module ~~unit~~ **19** off ~~of~~ the end **29** of end segment **21**. "W" palletized freight module ~~Palletized unit~~ **19** preferably has a zero velocity relative to the target surface **13 or 33**.

**[0033]** Hydraulic fluid is stored in a reservoir **59** and delivered by a hydraulic circuit to pumps **71** and **72**. Pump **71** supports operation of the conveyors **27**, **31** and

**41**. The hydraulic circuit supporting conveyor **27, 31, 41** operation includes three valve bodies **73**, **74** and **75** which deliver fluid to hydraulic motors **79**, **80** and **81**, respectively, to operate motors **79-81** in either of two directions. Since each motor **79, 80, 81** is controlled by its own valve body **73, 74, 75**, the motion of the conveyors **27, 31, 41** may be coordinated, or any one may be independent of the remaining conveyors. A valve controller **65** coupled to data bus **61** controls operation of the valve bodies **73-75** under instruction of microcontroller **57**.

**[0035]** Translation of platform **11** is performed by a translation mechanism **43**, which may be implemented in a worm gear arrangement or other mechanical arrangement for converting rotational motion of a motor **87** to linear movement. Additional motors **83** and **85** are provided for pumps **71** and **72**, respectively. All three motors **83, 85, 87** are under the control of a motor controller **63**. Motor controller **63** operates under the control of microcontroller **57**. Feedback to the operator over interface **67** may be provided by the inclusion of sensors which generate information relating to the position of packages on the platform **47**, support of the platform from below, or extent of extension of platform **11**. To this end various pressure sensors **89A-B**, position sensors **91A-C** and translation extension sensor **93** may be provided. Pressure sensors **89A** and **B** may provide operational information relating to status of the hydraulic circuits. Position sensors **91A-C** may be various types of transducers used to locate palletized freight modules ~~units~~ **19** or the location of segments **21, 23, 25**. Lastly, data bus **61** is coupled, either directly or indirectly, to a trailer suspension control system **69** to allow the trailer height to be adjusted to bring the bed **47** of the trailer **10** level with a raised dock.

**[0036]** The invention provides a compact, on board cargo handling system for a trailer **10** which is useable at both improved and unimproved locations for unloading of cargo such as palletized freight modules **19**. While not directed to ~~cargo~~ loading of palletized freight modules **19**, the system can be used to reposition ~~cargo~~ modules on board without the need to drive a forklift truck onto the bed **47** of the ~~vehicle~~ trailer **10**.